Title (en)

Diamond semiconductor device.

Title (de)

Diamant-Halbleiteranordnung.

Title (fr)

Dispositif semi-conducteur en diamant.

Publication

EP 0643423 A3 19950809 (EN)

Application

EP 94113945 A 19940906

Priority

JP 22623593 A 19930910

Abstract (en)

[origin: EP0643423A2] A diamond semiconductor device of the present invention comprises an n-type diamond layer to which an n-type dopant is doped at high concentration so that metal conduction dominates, a p-type diamond layer to which a p-type dopant is doped at high concentration so that metal conduction dominates, and a high resistance diamond layer formed between the n-type diamond layer and the p-type diamond layer. Here, the thickness and the doping concentration of the high resistance diamond layer are values at which semiconductor conduction dominates. Then, in a case that an applied voltage is forward bias, electrons are injected from the n-type region to the p-type region through the conduction band of the high resistance region, and holes are injected from the p-type region to the n-type region through the valance band of the high resistance region, so that a current flows. On the other hand, in a case that an applied voltage is reverse bias because substantially no dopant is doped to the high resistance diamond layer, carriers are not present, so that a large current does not flow. Therefore, semiconductor conduction dominates as carrier conduction in pn junction and the rectification can be obtained, so that with the control of carriers, good diode characteristics or transistor characteristics can be achieved.

IPC 1-7

H01L 29/16

IPC 8 full level

C30B 29/04 (2006.01); **H01L 29/16** (2006.01); **H01L 29/74** (2006.01); **H01L 29/772** (2006.01); **H01L 29/861** (2006.01)

CPC (source: EP US)

H01L 29/1602 (2013.01 - EP US); **H01L 29/74** (2013.01 - EP US); **H01L 29/7722** (2013.01 - EP US); Y02E 10/548 (2013.01 - EP)

Citation (search report)

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